

Tailor-made reactors

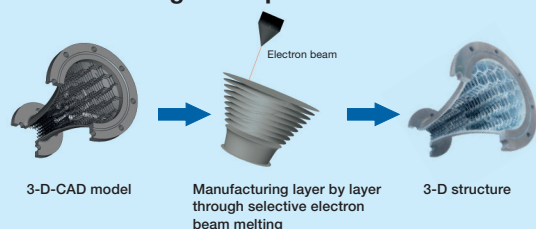
made by additive manufacturing

Geometrically complex components

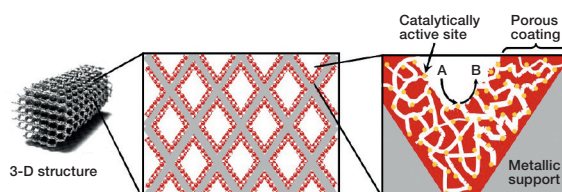
Additive manufacturing by Selective Electron Beam Melting (SEBM) enables the production of freely shaped geometries starting from metal powder.

- catalytic converters
- hierarchically structured catalyst supports
- separators and static mixers

Manufacturing concept

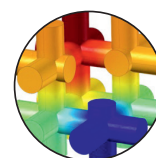


Schematic representation



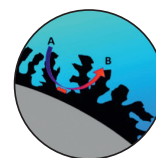
3-D structure with optimized geometry in terms of

- fluid mechanics
- heat integration
- mass transport



Surface functionalization

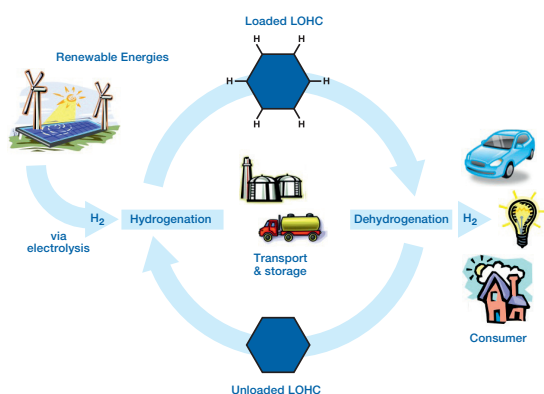
- porous coating offering high surface
- oxidic and carbonaceous materials
- immobilization of catalytically active sites



Demonstrators /applications

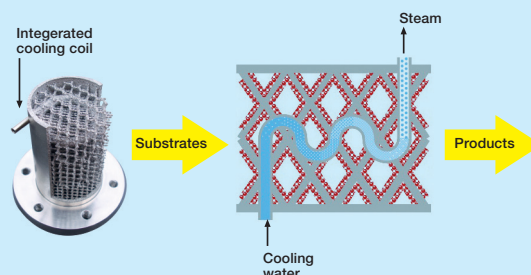
Dehydrogenation reactions

- An appropriate energy storage is a main challenge of the German "Energiewende".
- Hydrogen is a green energy carrier but difficult to handle.
- Liquid Organic Hydrogen Carriers (LOHCs) which are dehydrogenated on demand enable safe hydrogen storage with high energy density.



Highly exothermic reactions

- optimal reaction control by perfect heat management
- in-situ generation of process steam



Hydrogenation of nitrobenzene to aniline

Gas phase process with integrated heat extraction enables energy efficient process with high space time yield.

